A NEW SPECIES OF *METAPHYCUS* MERCET (HYMENOPTERA: ENCYRTIDAE) FROM CHINA, PARASITOID OF *PARASAISSETIA NIGRA* (NIETNER) (HOMOPTERA: COCCOIDEA)[1]

Yan-Zhou Zhang,[2] Da-Wei Huang,[2,3] Yue-Guan Fu,[4] and Zheng-Qiang Peng[4]

ABSTRACT: *Metaphycus parasaissetiae* sp. n., belonging to *M. zebratus* species group, is described from China. Photomicrographs are provided to illustrate morphological characters of the species. *Metaphycus parasaissetiae* is an important parasitoid of the Nigra Scale, *Parasaissetia nigra* (Nietner).

KEY WORDS: Hymenoptera, Encyrtidae, *Metaphycus parasaissetiae* sp. n., *Parasaissetia nigra,* Homoptera, Coccoidea, China

The Nigra Scale, *Parasaissetia nigra* (Nietner) is a well-known plant sap-sucking scale insect in family Coccidae (Homoptera: Coccoidea) (Ben-Dov, 1978; OEPP/EPPO, 2002). It is now a serious insect pest of *Hevea brasiliensis* (Brazilian rubber tree, Euphorbiaceae), an economically important plant in southern China, Yunnan Province (Duan et al., 2005; Guan et al., 2005). For example, in Xishuangbanna, about 40666.7 hectares of *H. brasiliensis* plantations are severely damaged following heavy infestation by *P. nigra* (Duan et al., 2005). A recent investigation of the natural enemies of this pest revealed an undescribed species belonging to genus *Metaphycus* Mercet (1921) (Hymenoptera: Encyrtidae) played an important role in regulating numbers of *P. nigra* in this area (Guan et al., 2005). The *Metaphycus* species is described here in order to provide the taxonomic basis for further research into its potential role as biological control agents of *P. nigra.*

The description of the new species is based on specimens reared from *P. nigra* collected in the Experiment Farm of Yunnan Institute of Tropical Crops, Jinghong City, Xishaunbanna, Yunnan Province, China. Morphological terminology generally follows that of Guerrieri and Noyes (2000), and Noyes (2004). Absolute measurements are used for body length. Relative measurements are used for other dimensions. All specimens examined, unless otherwise specified, are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing (IZCAS).

[1] Submitted on April 10, 2006. Accepted on April 23, 2006.

[2] Institute of Zoology, Chinese Academy of Sciences, Beijing 100080, P.R. China. E-mail: zhangyz@ioz.ac.cn. Corresponding author.

[3] Plant Protection College, Shandong Agricultural University, Taian, 271018, P.R. China. E-mail: huangdw@ioz.ac.cn.

[4] Environment and Plant Protection Institute, Chinese Academy of Tropical Agricultural Sciences, Hainan, Danzhou, 571737, P. R. China. E-mail: fygcatas@163.com.

Mailed on April 27, 2007

Metaphycus parasaissetiae Zhang and Huang sp. n.

Figs. 1-8

Description. Female: Body length 1–1.65 mm; Head with frontovertex orange, genae and face yellowish white except lower part of genae and mouth margin dark brown; occiput nearly entirely black; pronotum anteriorly dark brown, posteriorly yellow to yellowish white and with a dark brown spot on each side; mesoscutum, axillae and scutellum orange, sometimes with a brownish hue; tegula yellow, apically brownish; metanotum and propodeum dorsally black; sides and venter of thorax yellowish white; antennal scape in outer aspect dark brown except dorsal margin, apex and base whitish (Fig. 1a); inner aspect of scape nearly entirely dark brown except dorsal margin, extreme apex and base yellowish white (Fig. 1b); basal half or so of pedicel dark brown; F1-F4 dark brown, F3 or F4 often internally yellowish white, F5-F6 yellowish white; clava black except extreme apex yellowish; wings hyaline; legs yellowish white, each tibia with two almost complete dark brown rings and with apices brownish; gaster dorsally dark brown and ventrally yellowish.

Head. Head about 4.6x as wide as frontovertex; frontovertex about 2.3x as long as wide; ocelli forming an angle of about 45°; posterior ocellus separated from inner eye margin by about half its diameter and 2x its diameter from occipital margin; antenna (Fig. 1) with scape distinctly expanded and flattened, about 2.3x as long as broad; funicle with F1-F4 distinctly smaller than F5-F6, F5-F6 bearing linear sensilla; clava 3-segmented, apically more or less transversely truncated; maxillary palpi 4-segmented; labial palpi 3-segmented (Fig. 2).

Thorax. Mesoscutum with notaular lines incomplete and reaching about half way across mesoscutum; forewing about 2.5x as long as broad, venation as in Fig. 5.

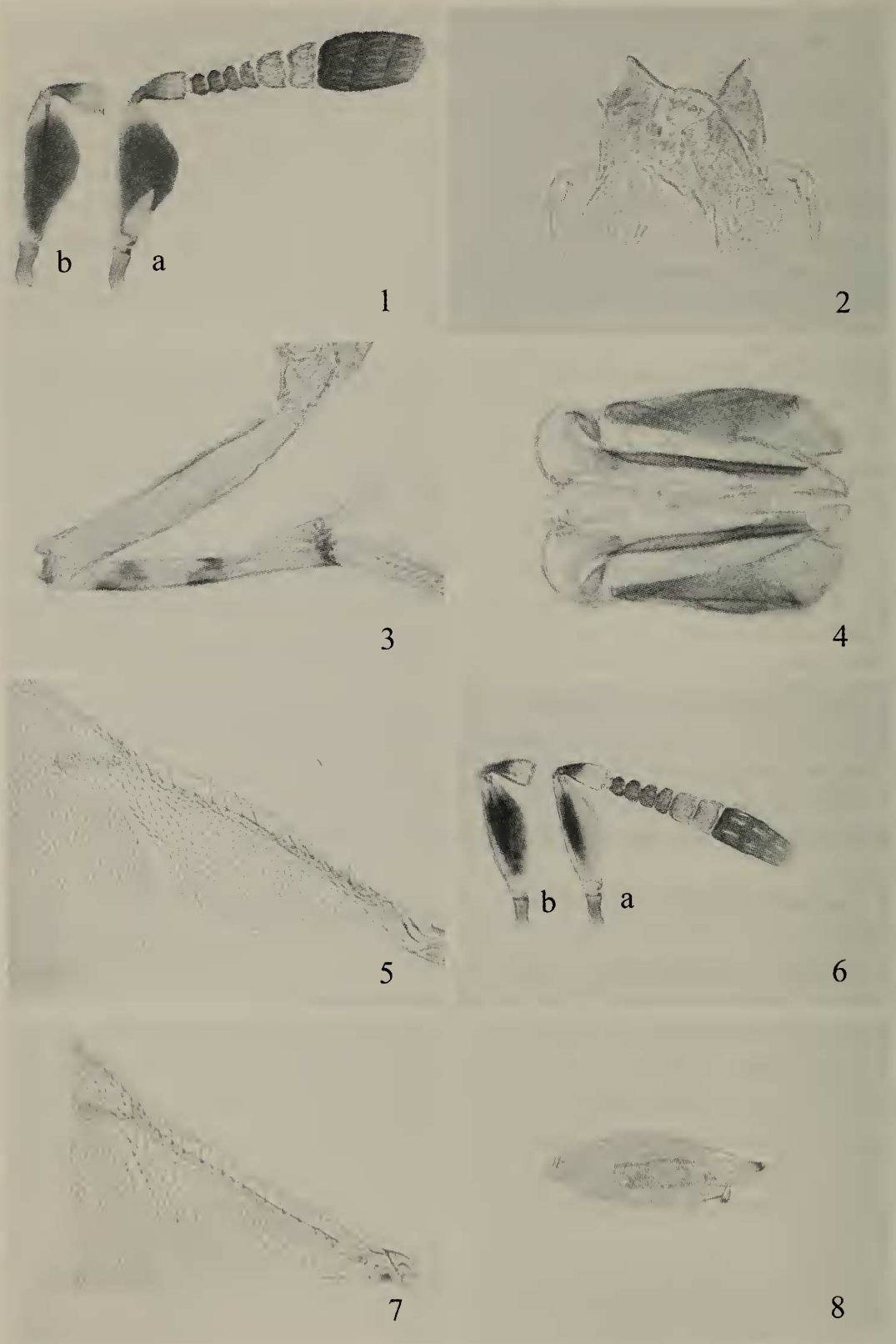
Gaster. Ovipositor (Fig. 4) not exserted or hardly so, about as long as mid-tibia (Fig. 3).

Relative measurements. Head width 65, Frontovertex width 14, POL 6, OOL < 2, AOL 6, Scape length 30, Scape width 13, Forewing length 150, Fore wing width 60, Mid-tibia length 54, Ovipositor length 55, Gonostylus length 8.

Male. Body length 1–1.2 mm, otherwise similar to female but for the antenna (Fig. 6), forewing (Fig. 7), and genitalia (Fig. 8), antennal scape in outer aspect whitish except a longitudinal dark brown band along dorsal margin (Fig. 1a); inner aspect of scape nearly entirely dark brown except dorsal margin, extreme apex and base yellowish white (Fig. 1b); antennal scape about 3x as long as broad.

Biology. A gregarious parasitoid of *Parasaissetia nigra* (Nietner). One to eight individuals have been observed to emerge from a single host.

Type Material: Holotype. female, CHINA: Yunnan: Xishuangbanna (Jinghong City, Junnan Institute of Tropical Crops), 28.vii.2004, ex. *Parasaissetia nigra* (Nietner) on *Hevea brasiliensis* coll. FP Zhang and ZQ Peng (IZCAS). Paratypes. 19 females, 5 males, same data as holotype (IZCAS).



Figs. 1-8. *Metaphycus parasaissetiae,* sp. n., 1-5, female: 1. antenna outer aspect (a), scape inner aspect (b); 2. maxillary palpi and labial palpi; 3. mid leg; 4. ovipositor; 5. forewing; 6-8. male: 6. antenna outer aspect (a), scape inner aspect (b); 7. forewing; 8. genitalia.

Other material studied. Many females and males, reared from *Parasaissetia nigra* (Nietner) collected on *Hevea brasiliensis* in Yunnan, Xishuangbanna.

Table 1. Some diagnostic characters of *Metaphycus anneckei, M. hageni,* and *M. parasaissetiae*[1]

	M. anneckei	*M. hageni*	*M. parasaissetiae*
Lower part of genae (♀)	Without dark brown band	Without dark brown band	With dark brown band
Ovipositor/Mid tibia (♀)	0.82 x (78/95)	1.2 x (41/34)	1 x (55/54)
Ovipositor/Gonostylus (♀)	4 x (78/20)	6 x (41/7)	7 x (55/8)
Toruli of male	Without associate pores	With associate pores	Without associate pores

[1] Characters of *Metaphycus anneckei* and *M. hageni* from Guerrieri and Noyes (2000)

Comments. Several keys to species of *Metaphcus* are used in identification of this *Metaphycus parasaissetiae.* Among them are Annecke and Mynhardt (1971), Viggiani and Guerrieri (1988), Trjapitzin (1989), Zeya and Hayat (1993), Guerrieri and Noyes (2000), and Noyes (2004). By using the most recent ones (Guerrieri and Noyes, 2000), *Metaphycus parasaissetiae* runs to key couplet 56, whithin the *zebratus*-group (maxillary palpi 4-segmented), that includes *Metaphycus hageni* Daane and Caltagirone (1999) and *Metaphycus anneckei* Guerrieri and Noyes (2000). *Metaphycus parasaissetiae* can be separated from both of them by characters listed in Table 1.

ACKNOWLEDGEMENTS

This project was supported by the National Natural Science Foundation of China (NSFC grant no. 30500056), the National Natural Science Foundation of China (NSFC grant no. 30330090) and partially by National Science Fund for Fostering Talents in Basic Research (NSFC-J0030092). We thank Dr. S. A. Wu, College of Natural Resources and Environment, Beijing Forestry University, for identification of *Parasaissetia nigra* (Nietner). Four anonymous reviewers provided valuable suggestions for improving the manuscript.

LITERATURE CITED

Annecke, D. P. and M. J. Mynhardt. 1971. The species of the *zebratus*-group of *Metaphycus* Mercet (Hym., Encyrtidae) from South Africa, with notes on some extra-limital species. Revue de Zoologie et de Botanique Africaines 83: 322-360.

Ben-Dov, Y. 1978. Taxonomy of the Nigra Scale *Parasaissetia nigra* (Nietner) (Homoptera: Coccoidea: Coccidae), with Observations on Mass Rearing and Parasites of an Israeli Strain. Phytoparasitica 6: 115-127

Daane, K. M. and L. E. Caltagirone. 1999. A new species of *Metaphycus* (Hymenoptera: Encyrtidae) parasitic on *Saissetia oleae* (Olivier) (Homoptera: Coccidae). Pan-Pacific Entomologist 75 (1): 13-17.

Duan, B., M. Zhou, J. Z. Li, and G. H. Li. 2005. Identification and control of a scale insect in Xishuangbanna of Yunnan Province. Tropical Agricultural Science & Technnology 28 (2): 1-3.

Guan, Z. B., Y. Chen, J. L. Lei, and Y. W. Pan. 2005. Scale insect of rubber plantation break out in Xishuangbanna of Yunnan Province. Plant Protection 31 (1): 92-93.

Guerrieri, E. and J. S. Noyes. 2000. Revision of European species of genus *Metaphycus* Mercet (Hymenoptera: Chalcidoidea: Encyrtidae), parasitoids of scale insects. Systematic Entomology 25: 147-222.

Mercet, R. G. 1921. Fauna Iberica. Himenopteros Fam. Encyrtidos. 727 pp. Museo Nacional de Ciencas Naturales, Madrid.

Noyes, J. S. 2004. Encyrtidae of Costa Rica (Hymenoptera: Chalcidoidea), 2. *Metaphycus* and related genera, parasitoids of scale insects (Coccoidea) and whiteflies (Aleyrodidae). Memoirs of the American Entomological Institute 73: 1-459.

OEPP/EPPO. 2002. Diagnostic protocols for regulated pests, *Parasaissetia nigra.* Bulletin OEPP/EPPO Bulletin 32: 293–298.

Trjapitzin, V. A. 1989. Parasitic Hymenoptera of the Fam. Encyrtidae of Palaearctics. Opredeliteli po Faune SSSR 158: 1-489. Zoologicheskim Institutom Akademii Nauk SSR, Leningrad. in Russian.

Viggiani, G. and E. Guerrieri. 1988. Italian species of the genus *Metaphycus* Mercet (Hymenoptera: Encyrtidae). Bollettino del Laboratorio di Entomologia Agraria 'Filippo Silvestri', Portici 45: 113-140.

Zeya, S. B. and M. Hayat. 1993. A review of the Indian species of *Metaphycus* (Hymenoptera: Encyrtidae). Oriental Insects 27: 185-210.